
Table of Contents

Condition Based Service - CBS

Subject	Page
Introduction	2
Purpose of the System.....	3
Principle of Operation.....	3
Service Indications.....	5
Resetting Service Items	
- Using the Instrument Cluster.....	8
Setting/Resetting Service Items	
- Using the DISplus/GT1.....	10
CBS Handover Inspection.....	10
CBS Correction Tester Data.....	15
CBS Reset.....	16
CBS Correction Vehicle Data.....	19
Review Questions	20

Condition Based Service - CBS

Model: E65 - 745i / E66 - 745Li

Production Date: 11/2001 - E65, 03/2002 - E66

Objectives of The Module

After Completing this module, you will be able to:

- Describe the sensor based service items.
- List the internally calculated service items.
- Identify the service indications.
- Demonstrate how to extract Condition Based Service information from the Control Display.
- Properly program the State and Emission Inspection dates using the Control Display and the DISplus/GT1.
- Reset Condition Based Service and maintenance items using the DISplus/GT1.

Condition Based Service (CBS)

Purpose of the System

The current Service Interval Indicator systems (SIA3 and SIA4) determine maintenance intervals based on fuel consumption, which is done to assess the need to change the engine oil. The main determining factor for the maintenance interval currently is the condition of the engine oil. Other maintenance needs, including the replacement of wear and tear items, are arranged to coincide with due engine oil changes.

On the E65/E66, BMW is measuring the need for maintenance of several critical components besides the engine oil, and independently of the engine oil. This would theoretically afford us the ability to bring a vehicle in for service whenever one of the measured components requires maintenance or replacement. However, customers would be inconvenienced because the maintenance intervals would be dramatically reduced.

Condition Based Service (CBS - further development of SIA) strikes a compromise between too frequent maintenance and too rigid intervals which call for the replacement of maintenance items that may still have substantial useful life left. *The objective is to furnish economical maintenance by providing the ideal service for individual vehicles.*

Principle of Operation

Sensor Based CBS Service Items

The trend in the vehicle service business is to lengthen service intervals and reduce replacement of maintenance items. Additional measures have been taken to keep the vehicles in a roadworthy and comfortable condition.

Usage dependent maintenance of select wear and tear items is detected by physical and virtual sensors. This means that, in cases where the wear is not measured directly, the service due date will be determined by using auxiliary variables such as mileage, vehicle performance, temperature, etc.

Sensors built into certain components and control module algorithms take even more detailed account of the various conditions of vehicle use. The remaining times for selected maintenance tasks as well as any dates for State and/or Emissions Inspections (determined by the state in which the vehicle is registered) are individually displayed.

CBS determines the current and future maintenance requirements. The current status of Service items determined by CBS are shown in the Control Display. This data can also be read from the vehicle key by using the Key Reader, as the vehicle's current service status is automatically saved in the ignition key every time the key is used to operate the vehicle.

Three sensors detect the following wear conditions:

- Engine oil (sensor)
- Microfilter (virtual sensor)
- Front and rear brake linings (sensor as reference point)

The instrument cluster collects the values from the wear detection control modules and manages the internally defined service schedule. Data exchange is carried out on the bus systems.

Internal Calculation of CBS Service Items

For certain wear and tear items, sensors are not needed by the Condition Based Service. The wear items that are calculated and managed internally by the instrument cluster are:

- Brake fluid
- Coolant
- Spark plugs
- Visual and functional checks (vehicle check)
- Official State Safety and/or Emissions Inspections

The maintenance of these items is performed at fixed intervals. The residual wear or the remaining time to next service is calculated by the instrument cluster using the travel/time parameters of: mileage, current date and internal distance counter. When a service item is due, it is shown in the instrument cluster or the Control Display.

Note: The internal distance counter plays a particular role. Unlike the Time/Date, this counter cannot be set by the driver.

However, battery down times (battery cut off by the distribution switch) also stop the trip distance counter which leads to longer time based service intervals. This will disrupt the CBS volumes for engine oil, microfilter, brake fluid and coolant.

To correct this, the internal counter status must be reset by the DISplus/GT1. The wear dependent items internally calculated by the instrument cluster are stored in the instrument cluster and in the CAS control module (redundancy).

Note: The instrument cluster and the CAS must not be replaced simultaneously, otherwise all current oil maintenance schedule data will be lost.

Service Indications

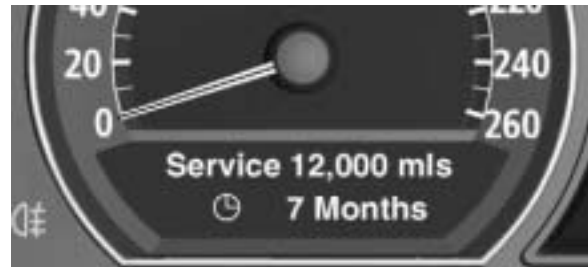
Regarding CBS, there are three different service indicators:

- Service need display (SBA) in the instrument cluster (base of speedometer)
- Check Control display in the instrument cluster (base of tachometer)
- CBS indicator in the Control Display

Service Need Display (SBA)

The Service Need Display is the evolution of the SIA4 Service Interval display. When KL15 is "ON," the Service Need Display appears under the speedometer in the instrument cluster for 10 seconds in the place where the fuel tank level is normally displayed.

The first line corresponds to the mileage dependent service items. It specifies the mileage when the next service is due. If the mileage is exceeded (service overdue), it appears with a minus sign.



42-15-01

The second line corresponds to the time dependent service items and is displayed by a clock symbol. It specifies the weeks/months/years when the next service is due. If the service is overdue, it appears with a minus sign.

The actual service item (with additional information) can be viewed in the Control Display.

Check Control Message

The CBS produces a Check Control message that indicates the brake lining wear at the front or rear axle. When the brake linings are worn, this is shown as follows:

- The general brake warning lamp and the variable control lamp come on in the instrument cluster.
- The variable control lamp shows the symbol of a car on a lifting platform.



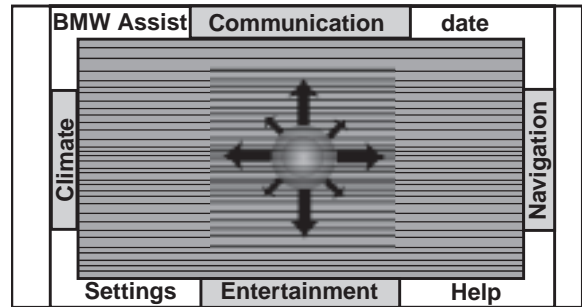
42-15-17

A brief Check Control message appears: "Service, see Vehicle menu." For more detailed information, the user can access the Control Display.

CBS Indicator in the Control Display

The Control Display provides additional information on service and maintenance procedures by selecting the "OB data" menu.

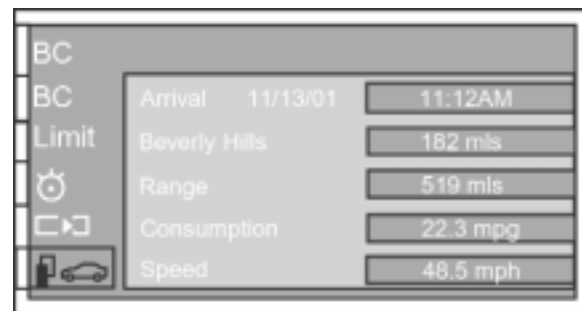
After releasing the Controller or returning to the central position, the "On-board data" menu appears.



42-15-19

Turn the Controller to the left until the bottom left button is highlighted (vehicle symbol).

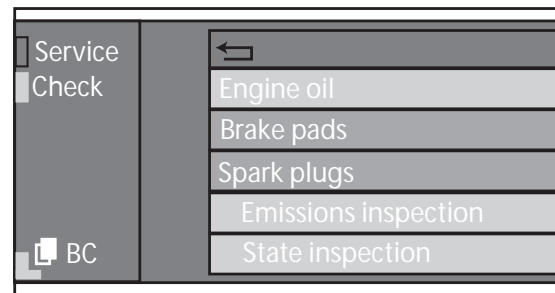
Confirm your selection by pressing the Controller.



42-15-02

The CBS menu appears with the service items.

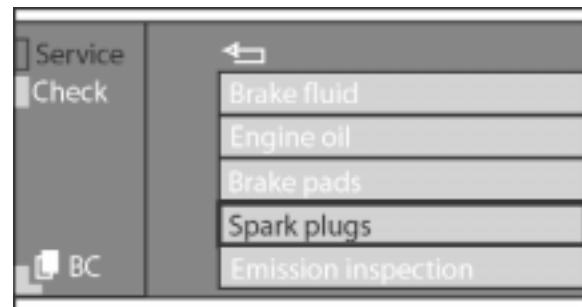
The Control Display shows a list of selected service and maintenance procedures, as well as legally-mandated official inspections.



42-15-03

Now you will see a service road in the Control Display. The service and maintenance procedures are displayed in different colors:

- Green: No service is currently required
- Yellow: Service deadline is approaching
- Red: Service deadline has already passed



42-15-04

The service items highlighted in red with the highest priority appear in the bottom part of the display.

You can scroll through the list of service and maintenance procedures from top to bottom by turning the Controller from right to left. You can leave the list of service items by pressing the button with the Up arrow symbol.

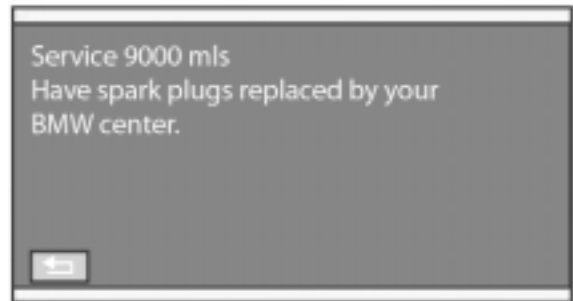
The service and maintenance items are:

- | | | |
|-----------------------------------|------------------|--------------------------|
| 1. Engine oil | 5. Brake fluid | 9. State Inspection |
| 2. Front brake pads | 6. Coolant | 10. Emissions Inspection |
| 3. Rear brake pads | 7. Spark plugs | |
| 4. Ventilation system microfilter | 8. Vehicle check | |

To display the service and maintenance item information in the Control Display, turn the Controller to select the item and confirm your selection by pressing the Controller.

For the "Spark plugs" service and maintenance item, for example, the following information appears:

1. Service due 9000 mls, Have your BMW Center replace the spark plugs.
2. Button with arrow symbol



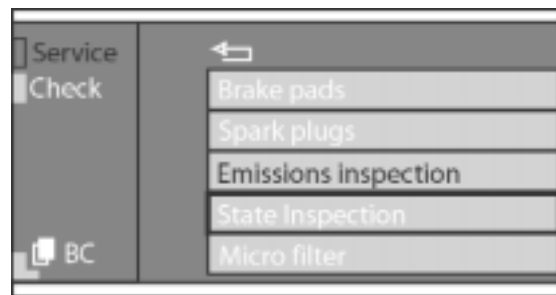
42-15-05

You can exit this menu by pressing the button with the arrow symbol at the bottom left. The lowest menu automatically closes after a short time (timeout) if you do not touch the controller. In the same way, you can access the full text for each service item.

To Enter and View Official Emissions and Vehicle Inspections Deadlines

If the E65 customer lives in a state which requires regular State and/or Emissions Inspections, these must be programmed into the vehicle's Condition Based Service System using the Controller as follows:

Select "Emissions Inspection" or "State inspection" and confirm your selection by pressing "down" on the controller.

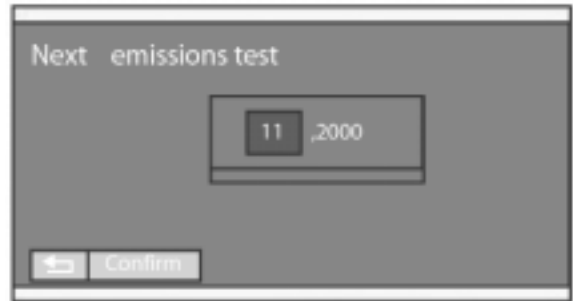


42-15-06

Turn the Controller to select an inspection date for entry.

Confirm the inspection date. The first part of the date entry is activated - here month.

Turn the Controller to reset. Press the Controller to store and move to the next entry - here year.

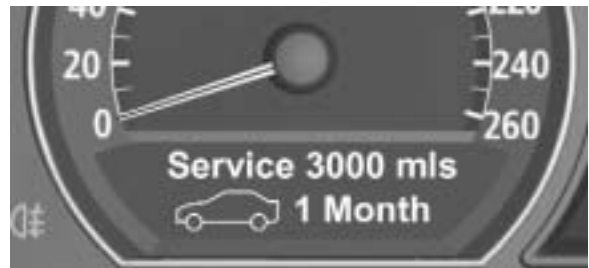


42-15-07

The system adopts the date when you store your entry. Press the Controller to select "CONFIRM".

Note: This function is only available if the time in the Control Display has been correctly set.

When the deadline for the next emissions or state vehicle inspection is approaching, the remaining distance and time will appear briefly in the base of the speedometer when the ignition is switched on "KL15" (as shown on the right).



42-15-08

Resetting Service Items - Using the Instrument Cluster

When one or more service and maintenance items has been performed, these items must be reset (to the full service interval). This is achieved via the instrument cluster or DISplus.

To reset a service item using the instrument cluster, press the reset button (1) on the top left side of the instrument cluster for > 10 seconds.



KT-9270

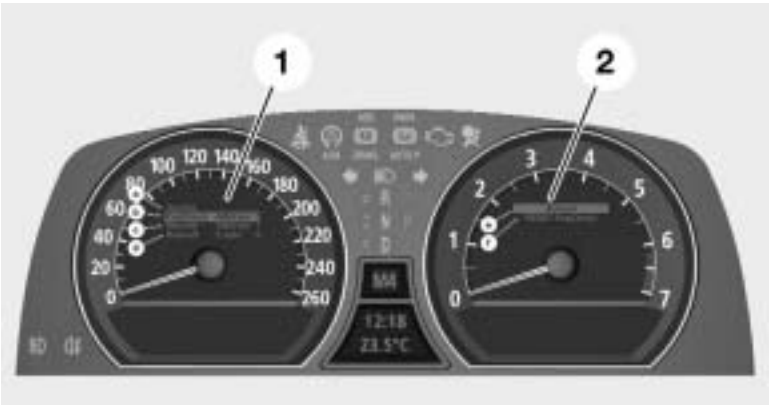
This brings you directly to Reset mode.

Notes: _____

A 4-line menu appears in the speedometer. At the top is the Back function, then the first three service and maintenance items sorted by priority. In addition, the residual wear or the remaining time are specified (possibly with a minus sign).

The "!" symbol means that you can reset this service and maintenance item, while a "0" indicates it is not able to be reset (the first 20% of the service interval is protected against premature/accidental reset).

- 1. Service items (in the speedometer)
- 2. Resettable service item (in the tachometer)
 - a. Back
 - b. Vehicle Check
 - c. Microfilters
 - d. Brake fluid
 - e. Back
 - f. RESET Vehicle Check



KT-8988

You can scroll through the service and maintenance items by pressing the reset button or the lower axial (FAS) button on the turn signal/high beam switch. When you have selected a service item, press the reset button for a few seconds to display a 2-line menu in the tachometer.

The Back function is at the top and the resettable service and maintenance item is below it. Now select the service and maintenance item with the reset button (or the axial button) and press the reset button again for a few seconds.

In a third menu line, the system confirms that the reset was successful. The whole interval for the service operation is highlighted in the Service Need Display.

Notes: _____

Setting/Resetting Service Items - Using the DISplus/GT1

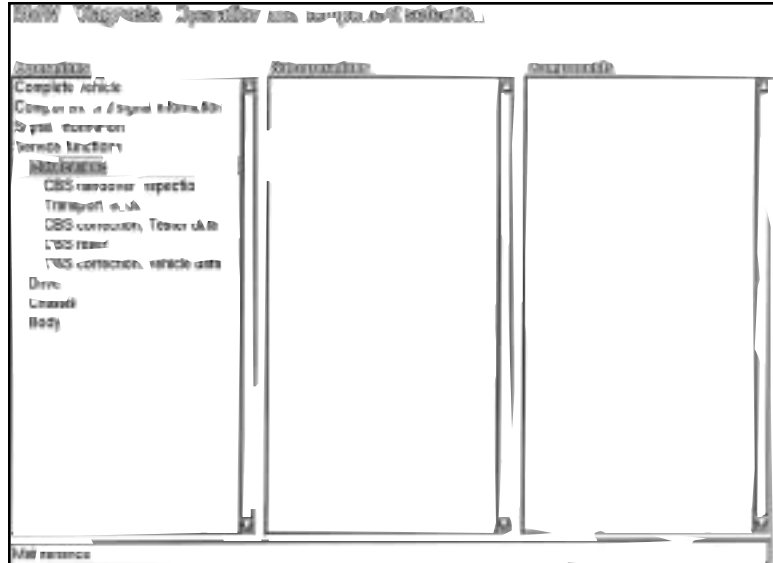
E65/E66 Vehicle Preparation and Maintenance Requirements settings of CBS are performed using the DISplus/GT1. This also includes programming the phone numbers for the customer's preferred BMW center and BMW of North America's Customer Relations into the BMW ASSIST menu of the Control Display. Refer to **SIB # 84 14 01**.

CBS Handover Inspection

The CBS handover inspection is for the deletion of past data in the vehicle and reconfiguring the vehicle for latest data (updating after a service).

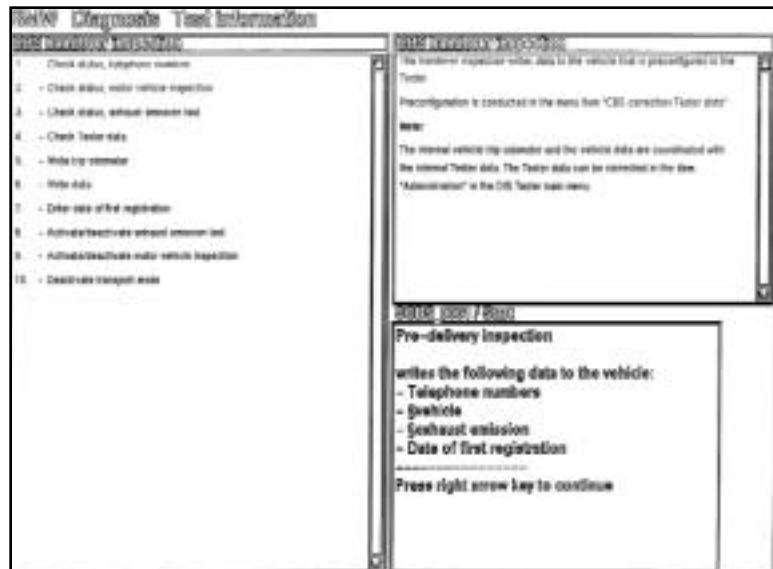
The CBS resetting procedure is found under: **Service Functions - Maintenance - CBS**.

Select the CBS handover inspection and press <Test Plan>. Highlight the procedure bar and press the <Green Arrow> to the right.



The CBS handover inspection includes:

1. Check status, telephone numbers
2. Check status, vehicle inspection *
3. Check status, exhaust emission *
4. Check Tester data
5. Write trip odometer
6. Write data
7. Enter date of first registration
8. Activate/deactivate Emission test *
9. Activate/deactivate vehicle (State - Safety) Inspection *
10. Deactivate transport mode



* Set to coincide with the customer's state requirements.

1. The first step involves the status of telephone numbers *if the customer has the E65 CPT8000 telephone installed*. For additional details refer to *SIB # 84 14 01*.

When installing an E65 telephone and prior to customer delivery, the customer's local BMW dealer telephone number and the BMW Customer Relations (or Assistance) telephone number should be programmed into the vehicle in order to enable all features of the BMW mobile phone.

Note: The Roadside Assistance and the SOS/Emergency telephone numbers are preprogrammed into the Telematics Control Unit (TCU).

The programming of these telephone numbers is carried out in two parts. The first part programs the numbers to the DISplus, the second part transfers the numbers to the telephone handset (if the handset is used in another vehicle, the numbers go with the phone). Unless the numbers are changed for any reason, programming the numbers to the DISplus is normally a "one time" procedure. These numbers are retained in the DIS tester for future telephone installations.



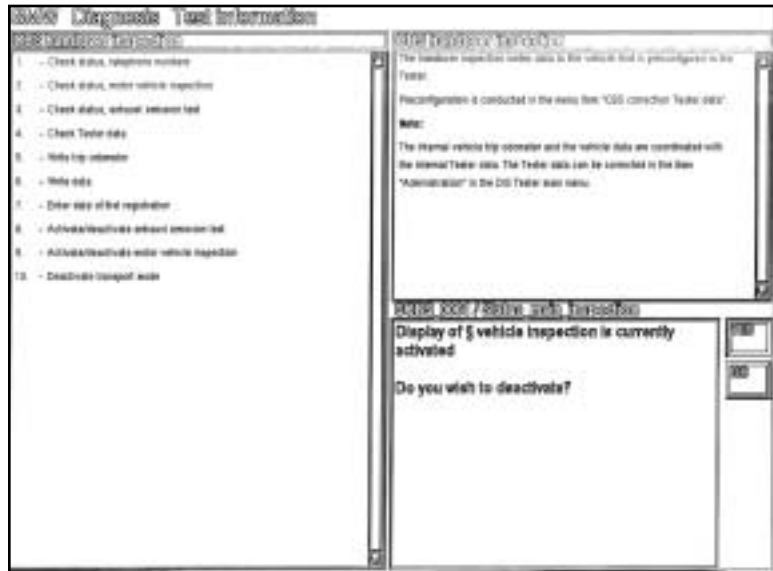
The BMW dealer telephone number can be entered here or changed later on in the CBS correction, Tester data.

Note: When entering a number, the "+" should preface an international phone number only.

2. & 3. This screen allows you to check the current Vehicle Inspection(s) due date, or it may be necessary to reset to coincide with the customer's state requirements.

If a customer desires, the Vehicle Inspection due dates can be deactivated.

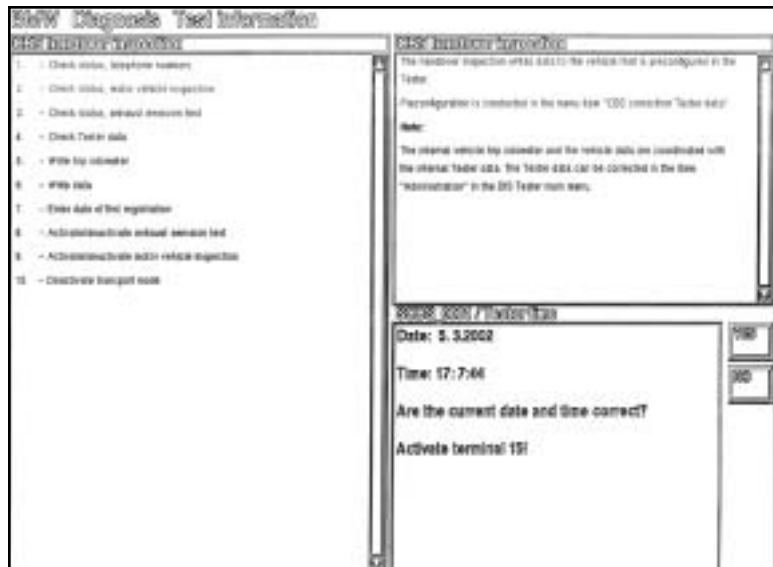
4. The next step is vital to synchronize the correct time and date from the DISplus/GT1 with the vehicle.



The internal vehicle trip odometer and vehicle data (**5. & 6.**) are coordinated with the internal Tester data.

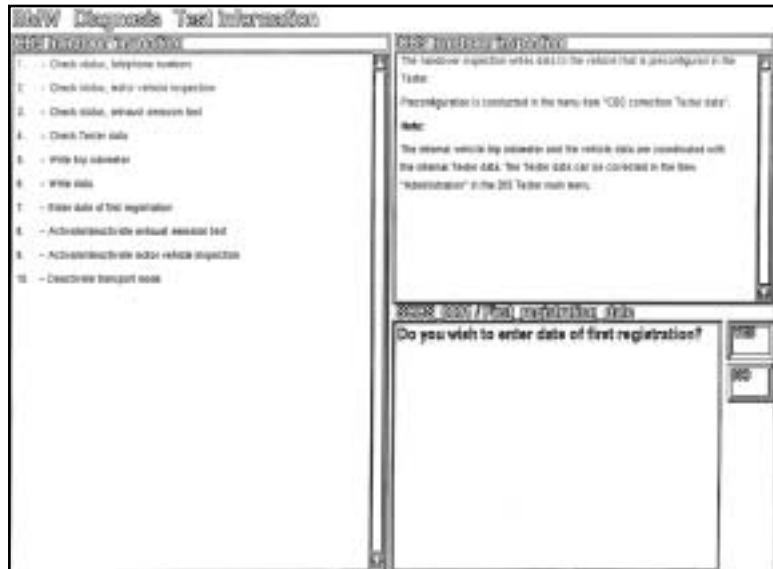
This is important for time/distance based service items that are managed by the instrument cluster.

If this is found to be incorrect, go back to the Administration page of DISplus/GT1 (main menu) and reset the current date and time.



Notes:

7. The first date of registration must be entered here. This will provide helpful verification for future service and warranty concerns.



By selecting <Yes>, the first of three screens is shown on the right.

This screen prompts you to input the numerical day of registration (1-31).

The second screen prompts you to input the numerical month of registration (1-12).

The third screen prompts you to input the numerical year of registration (last 2 digits of the year, for example: 02 for 2002).

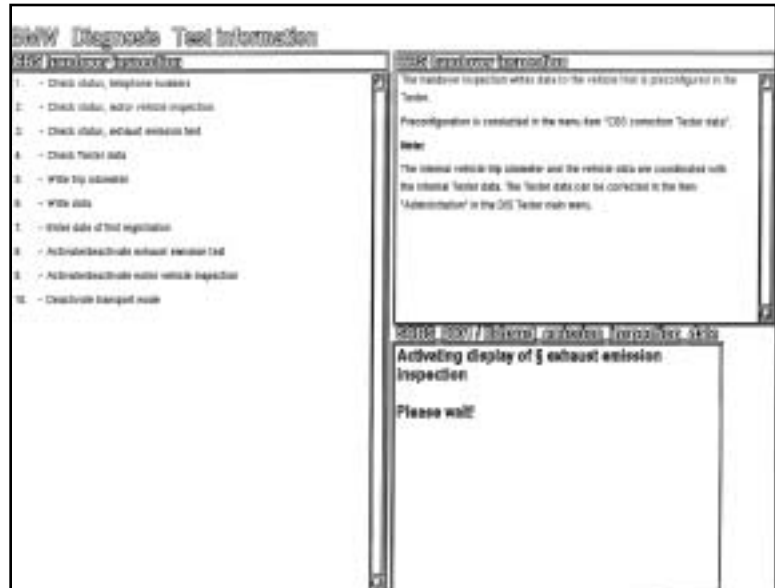


Notes: _____

8. This screen will activate/deactivate the displayed Emission Inspection date.

This will allow you to provide the "next" date that the Emission Inspection will be due as shown in the SBA (base of the speedometer) and Control Display.

If a customer desires, the Vehicle Emission Inspection due date can be deactivated.

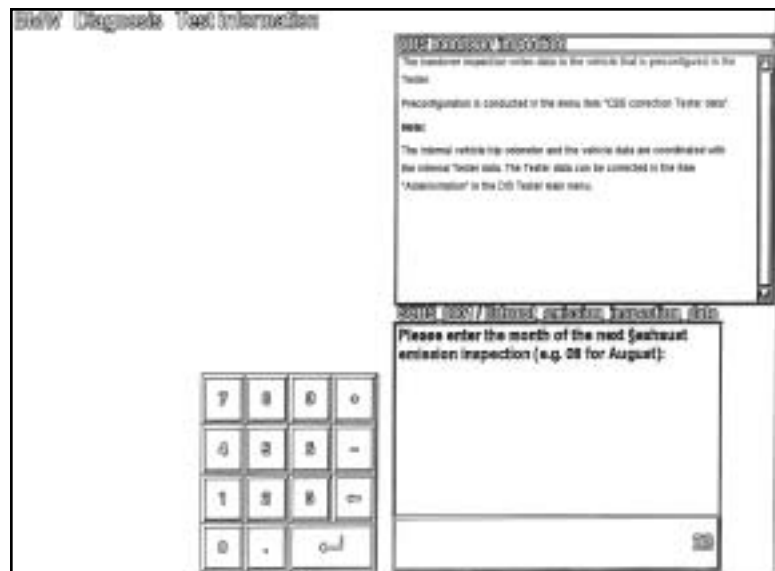


The first of two screens is shown on the right.

This screen prompts you to input the numerical month of the next Emission Inspection (for example: 08 for August).

The second screen prompts you to input the numerical year of the next Emission Inspection (last 2 digits of the year, for example: 04 for 2004).

The following is a repeat of the above procedure (inputting) regarding *State Inspection*.



9. This step will activate/deactivate the displayed State Inspection date. This will allow you to provide the "next" date that the State Inspection will be due as shown in the SBA (base of the speedometer) and Control Display. If a customer desires, the Vehicle State Inspection due date can be deactivated.

The first of two screens will be shown. This screen prompts you to input the numerical month of the next State Inspection. The second screen prompts you to input the numerical year of the next State Inspection (same process as the Emission Inspection).

10. This procedure is necessary for deactivating the Transport mode and must be performed before the vehicle is delivered to the customer.

Many of the E65/E66 features (unnecessary during transporting) are "locked out". This includes: limited window operation (driver's side only), radio, Control Display, interior lights, a/c, etc.

Select <Yes> to terminate Transport mode and the vehicle will resume normal operation.

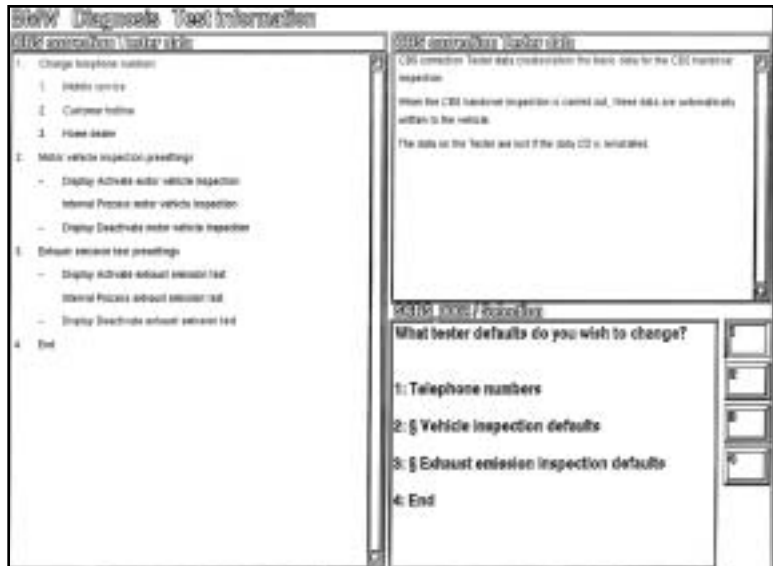


CBS Correction Tester Data

The CBS correction tester data allows "quick access" to create or change the basic data (stored in the tester) for the CBS handover inspection. When the CBS handover inspection is carried out, the changed data in the tester is automatically transferred to the vehicle. The procedure is found under: *Service Functions - Maintenance - CBS correction, Tester data.*

The CBS correction tester data includes:

1. Change telephone numbers
 - Mobile Service
 - Customer Hotline
 - Local Dealer
2. State Inspection presettings
 - Display/activate State Inspection (interval)
 - Display/deactivate State Inspection
3. Emission Inspection presettings
 - Display/activate Emission Inspection (interval)
 - Display/deactivate Emission Inspection



CBS Reset

The CBS Reset procedure provides resetting of the individual Condition Based Service items. *The items that require a reset depend on the individual vehicle usage.* When one or more service and maintenance items has been performed, these items must be reset. This was previously shown using the instrument cluster.

Using the DISplus/GT1, the CBS Reset sets the selected service and maintenance items to 100% (full service interval) and displays a service counter to indicate how many times these items have been reset. The procedure is found under: *Service Functions - Maintenance - CBS reset.*

Select the CBS Reset and press <Test Plan>. Highlight the procedure bar and press the <Green Arrow> to the right.

The first step is vital to synchronize the correct time and date from the DISplus/GT1 with the vehicle.

The internal vehicle trip odometer and vehicle data are coordinated with the internal Tester data.

This is important for time/distance based service items that are managed by the instrument cluster.



After accepting by pressing <Yes> or <No> and entering corrections to the date and time, select the <Green Arrow> to the right.

If this is found to be incorrect, go back to the Administration page of DISplus/GT1 (main menu) and reset the current date and time.

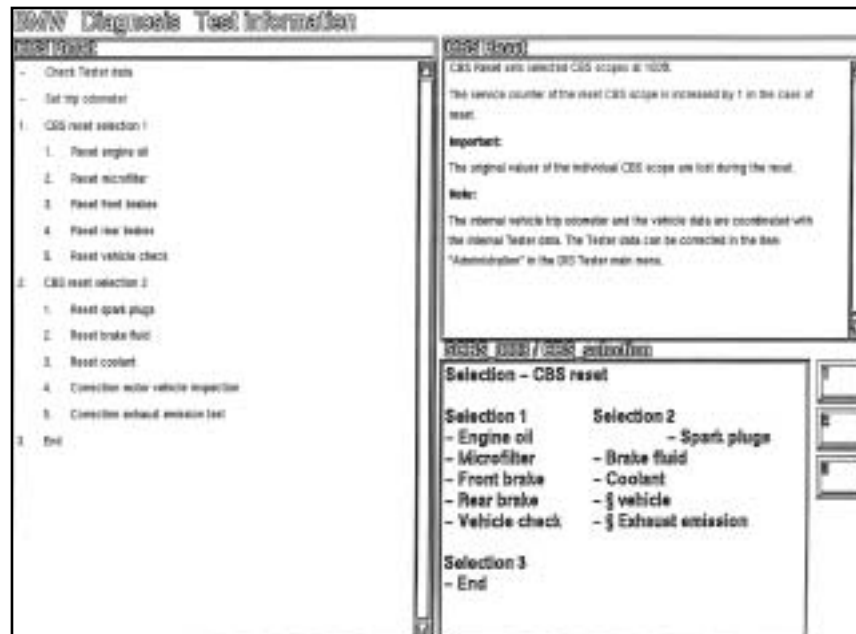
Note: The original values of the individual CBS service and maintenance items are deleted during the reset procedure.

This screen displays the following service and maintenance items:

Usage dependent wear and tear items are monitored by physical and virtual sensors. In cases where the wear is not measured directly, the service due date will be determined by using auxiliary variables such as mileage, vehicle performance, temperature, etc.

1. CBS reset selection 1

- Reset engine oil
- Reset microfilter
- Reset front brakes
- Reset rear brakes
- Reset vehicle check



Certain wear and tear items are calculated and managed internally by the instrument cluster (time and mileage) for Condition Based Service.

2. CBS reset selection 2

- Reset spark plugs
- Reset brake fluid
- Reset coolant
- Correction Vehicle State Inspection
- Correction Emission Inspection

3. End

By entering selection <1> and the <Green Arrow> to the right, the items are displayed in percentage.

By selecting the number <3> and the <Green Arrow> to the right, you can individually reset the service and maintenance item (front brakes) after the service was performed.

The reset example shown on the right displays that the front brakes have just been replaced (100) [%].

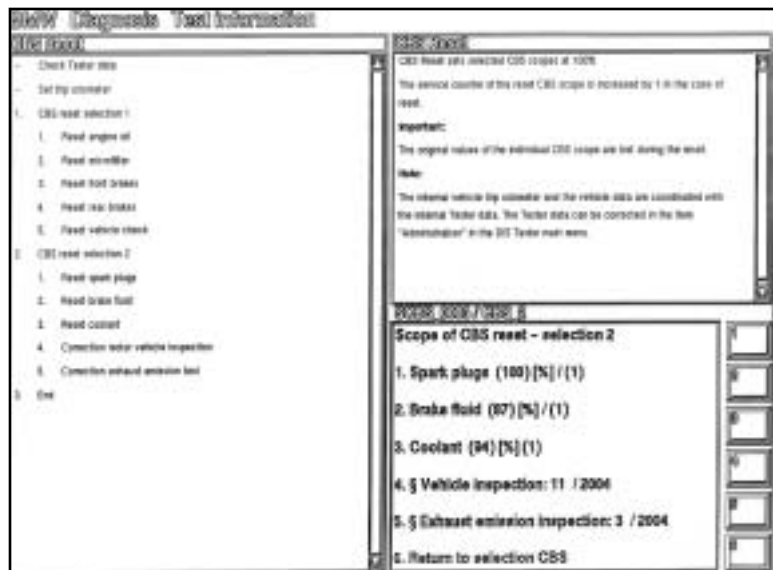
In addition, the number of times the item was reset is also displayed / (3), indicating three times.



By entering selection <2> and the <Green Arrow> to the right, the items are displayed in percentage.

By selecting the <number> and the <Green Arrow> to the right, you can individually reset the service and maintenance item after the service was performed.

In addition, the Vehicle State/Emissions Inspections can be verified and corrected.



Notes:

After verifying/correcting the data, this screen is displayed to confirm the correct date and time is set in the DISplus/GT1.

To properly complete the CBS Reset, the date and time of service/maintenance will be transferred to the vehicle. This includes setting the day counter and the date.

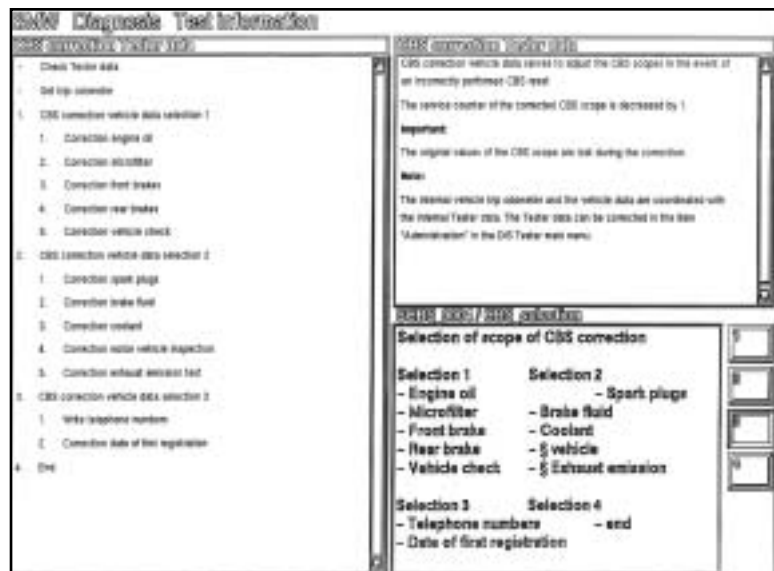
The transfer is completed by: selecting **OKAY** (in setting status).



CBS Correction Vehicle Data

The CBS correction vehicle data allows “quick access” to correct (if improperly input) or change the basic data (stored in the vehicle) for the CBS reset. This includes decreasing the use percentage and number of resets when a reset was mistakenly performed. When the CBS reset is carried out, the changed data in the tester is automatically transferred to the vehicle. The procedure is found under: *Service Functions - Maintenance - CBS correction, vehicle data.*

1. CBS correction vehicle data selection 1
 - Correction engine oil
 - Correction microfilter
 - Correction front brakes
 - Correction rear brakes
 - Correction vehicle check
2. CBS correction vehicle data selection 2
 - Correction spark plugs
 - Correction brake fluid
 - Correction coolant
 - Correction Vehicle State Inspection
 - Correction Emission Inspection
3. CBS correction vehicle data selection 3
 - Write telephone numbers
 - Correction date of first registration
4. End



Review Questions

- 1. List the internally calculated service and maintenance items: _____

- 2. What are the service indicators? _____

- 3. How is the Condition Based Service information extracted from the Control Display?

- 4. How many steps are required to properly program the Emission Inspection dates using the DISplus/GT1? _____

- 5. When performing a CBS Reset after replacing the rear brake pads using the DISplus/GT1, what information is displayed next to that item (line 4.)? _____

